Does part-time employment provide a way of accommodating a disability?

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Abstract

This paper examines the reasons for high rates of part-time employment amongst disabled workers in the UK. Evidence from the Labour Force Survey suggests that part-time employment provides an important way of accommodating a work-limiting disability rather than reflecting marginalisation of the disabled by employers. Differences in part-time employment within the disabled group are also examined.

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1. Introduction

Disability is consistently found to have a negative impact on employment probabilities and earnings in the UK (Jones, 2005). The reasons for this are more difficult to distinguish, in particular studies have sought to identify discrimination against the disabled using employment and earnings decompositions (Kidd et al. 2000 and Jones et al. 2006). Whilst these studies identify direct discrimination, marginalisation of the disabled may also take the form of restricting opportunities for the disabled, for example, in particular sectors or non-standard forms of employment (see Schur, 2002, 2003 and Hotchkiss, 2004 for US studies) and it is this issue that is the focus of the current paper. Schur (2002), however, also highlights two alternative explanations for the observed concentration of the disabled in non-standard forms of employment in the US. Firstly, disabled individuals may use non-standard employment as a way of accommodating their disability or as a transitional step to full time employment and, thus, they may have different preferences towards non-standard work. Secondly, disability benefits in the US impose a limit on earnings and therefore restrict the number of hours worked, encouraging part-time, rather than full time work for disabled individuals in receipt of benefit income.

While several studies in the UK have focused on the potential adverse effects of part-time employment on females (see for example, Manning and Petrongolo, 2004) these studies have not identified the important role it plays for the disabled. As in the US, disabled workers in the UK are more likely to be employed in several sources of non-traditional employment, for example on temporary contracts. However, the most significant difference is in the prevalence of part-time work between the disability groups. Currently, 11% of disabled male employees work part-time compared to 5% of the non-disabled group and 49% of disabled females working part-time compared to 39% of the non-disabled group.[2] The policy implications of this depend crucially on if the reasons underlying this represent constrained or voluntary choices for the disabled. If part-time employment provides the only viable source of employment due to the limitations imposed by their health, or, if it provides a path through which the disabled move from

[2] See Table 1.

inactivity to full time employment then it may be a mechanism to increase employment amongst of the disabled. If, in contrast, employers are constraining the opportunities of the disabled by limiting them to roles with fewer opportunities for progression and lower average earnings this form of unequal treatment should be recognised.

This paper uses data from the Labour Force Survey (LFS) in 2003 to examine the causes of the higher incidence of part-time employment amongst the disabled. Using a bivariate probit model which takes into account selection into employment it is possible to control for differences in the characteristics of disabled workers that may affect their probability to be part-time employed. Predicted conditional part-time employment probabilities can be decomposed between the disability groups to identify the proportion of the part-time employment gap that is unexplained. This unexplained component is traditionally used to measure unequal treatment in the labour market. If, however, disabled individuals have different preferences for part-time work, through its role as a workplace accommodation this will also be included in the unexplained gap and discrimination cannot be identified directly. This paper attempts to separate marginalisation by employers from differences in preferences for part-time work by extending the method used by DeLeire (2001) to examine wage discrimination. The non-work limited disabled group, who have a long-term health problem that does not affect either the amount or type of work they can do, are assumed to have no reason to choose part-time employment as a source of accommodation, and thus any unexplained component relative to the non-disabled reflects only unequal treatment. In a similar decomposition for the work limited disabled the unexplained component will reflect both unequal treatment and differences in preferences. If, as DeLeire (2001), unequal treatment is assumed constant between the two disabled groups then the importance of part-time employment as a way of accommodating disabled workers can be identified.

The remainder of this paper is structured as follows. Section 2 briefly considers the previous evidence relating to disability and non-standard employment in the US and discusses how these effects may differ in the UK. Section 3 outlines the data and

empirical methodology. Section 4 presents and discusses the results and section 5 briefly concludes.

2. Background

Several studies in the US document the concentration of disabled workers in non-standard forms of employment including part-time employment (Schur 2002, 2003 and Hotchkiss, 2004). Schur (2002) uses data from the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP) to highlight the negative effects of part-time employment on both earnings and entitlement to other benefits such as health insurance and pension rights. However, she notes that part-time employment can be an intermediate step for some who want to go on to full time work. When examining transitions over a year she found that this effect was no more important for the disabled, with 28% of the part-time disabled moving to full time employment compared to 33% of the non-disabled. Using the same data, Schur (2003) focuses on the reasons for the high rates of non-traditional employment among disabled workers and finds the evidence does not support the influence of discrimination or earnings limits imposed by benefits. She suggests the high rates of part-time employment reflect a voluntary choice of the disabled to accommodate their health concerns. Higher rates of part-time employment among more severely disabled workers and, particularly those who make more frequent visits to the doctors or hospital support the accommodation theory. Despite 27% of disabled part-time employees receiving disability benefit an increase in the earnings limit did not increase the earnings of disabled workers substantially suggesting the earnings limits set by benefits are far less important. Hotchkiss (2004) focuses specifically on part-time employment and identifies not only higher incidence of part-time employment amongst the disabled, but that the incidence of part-time employment of the disabled has increased from 27% in 1984 to 33% in 2000. She suggests the increase in the earnings allowance associated with benefit receipt in the 1990's may be a possible cause but that this trend is also consistent with employers willing to make accommodations in line with the Americans with Disabilities Act (ADA). She finds the growth in part-time employment was largely voluntary and again does not find evidence to support the existence of constrained opportunities by employers.

Whilst the theories relating to employer marginalisation and work place accommodation will apply in the UK, variations in the benefit regime and legislation may provide

different incentives to undertake part-time employment. In the UK, incapacity benefit is intended for those who are unable to work due to sickness or disability, however, permitted work can take the form of earnings up to £20.00 a week for an unlimited period or earnings of less than £78.00 per week for a 26 week period. Thus, in a similar manner to the US, only part-time work is permitted whilst in receipt of disability benefit.[3] In the US, 9.5% of people claiming Social Security Disability Insurance (SSDI) or Supplemental Security Income (SSI) disability income programs are employed (Schur, 2003), whereas in the UK the employment rate for incapacity benefit claimants is 4.3%. As expected, a higher proportion of disabled part-time workers are in receipt of incapacity benefits than full time workers (Table 1), but the figures are far lower than the corresponding rates in the US. The limited evidence therefore suggests disability benefits may contribute to the choice over hours but the dominant effect in the UK is on participation.

The introduction of the Disability Discrimination Act (DDA) in 1995 makes it unlawful to discriminate against disabled workers, whether employed full or part time. It also makes it the employers duty to make reasonable adjustments to the workplace or the employment contract to avoid disabled people being at a disadvantage in work. The implications for part-time employment are not obvious. Disabled individuals may have more freedom to request reductions in hours of work as a reasonable accommodation but equally employers make perceive it too expensive to make physical workplace accommodations for a disabled part-time worker.[4] Indeed the evidence, unlike in the US, shows the proportion of the disabled employed part-time employment has followed a similar pattern as the non-disabled group between 1994 and 2003, being fairly constant for females and increasing slightly for males. In contrast to the US experience following the ADA there is no evidence to suggest part-time employment of the disabled has increased amongst the work-limited disabled relative to the non-disabled since the DDA. In addition, the role of part-time employment plays as a route into full time employment

[3] A maximum limit of 16 hours applies.
[4] This effect would act in the opposite direction to constraining the disabled into part-time employment. However, the Access to work scheme in the UK should limit the real financial cost imposed on employers for accommodation.

appears to be quite limited in the UK. Using evidence from the longitudinal element of the LFS, 7.8% of disabled part-time workers are found to be in full time employment one year later compared to 10.8% of non-disabled part-time workers.[5] This paper therefore focuses on the two dominant explanations in the literature, unequal treatment amongst employers and differences in preferences, which are thought to be driven by the need for shorter hours to accommodate the disability.[6]

3. Methodology

An annual cross sectional data set is created using the four quarterly LFS surveys in 2003. Following DeLeire (2001) individuals are classed as work limited disabled (D_1) if they self report a long-term health problem that limits the type or amount of work they can do.[7] They are non work limited disabled (D_2) if they self report a long-term health problem that does not limit either the type or amount of work they can do. The rest of the population, who do not have a long term health problem comprise the non-disabled group (N).

Self reported disability is commonly used for labour market analysis, however, the possible influence of justification bias, where non-employed individuals tend to over report their disability to justify their economic status (see Bound, 1991), should be acknowledged. The empirical evidence on this issue is mixed, with some authors suggesting self reported disability is valid for labour market analysis (see for example, Dwyer and Mitchell, 1999 and Benitez-Silva et al., 2004) but others finding it leads to biased results (see, amongst others, Kreider, 1999 and Lindeboom and Kerkhofs, 2002). To a more limited extent the justification bias hypothesis may also extend to the choice between full-time and part-time work and, if present, would cause the impact of disability on part-time employment to be overestimated. However, data from the 2003 English Health Survey is used to confirm that the concentration of the disabled in part-time employment is not specific to the definition or the dataset used in the analysis and,

[5] Data covers annual transitions for four quarterly periods from Spring to Winter 2003-2004. These numbers are based on small cell sizes.

[6] In the US there is an additional incentive to employ individuals on a part-time rather than full time basis since part-time workers are often not eligible for benefits such as medical insurance.

importantly, extends to more objective measures of health, which are less likely to suffer from justification bias.[8]

The sample consists of individuals of working age but excludes full time students, the self employed, those on government training schemes and unpaid family workers. Since the choice of part-time or full time employment is only observed for those who are employed and they may represent a non-random selection of the population, the type of employment is modelled using a bivariate probit with selection (see Van de Ven and Van Praag, 1981) and has been applied previously to part-time employment (Hotchkiss, 2004).

A bivariate probit model is estimated separately for each of the j disability groups (j= D_1, D_2, N) and for each gender. The latent variable determining employment is:

$$E^*_{ij} = \gamma_j Y_{ij} + \mu_{ij} \qquad (1)$$

and the observed variable E_{ij} is related to E^*_{ij} as follows:

$$E_{ij} = \begin{cases} 1 & \text{if } E^*_{ij} > 0 \\ 0 & \text{otherwise} \end{cases}$$

Those in employment ($E_{ij}=1$) are restricted to employees and the non-employed ($E_{ij}=0$) include both the unemployed and inactive. The part-time employment equation is

[7] This is consistent with the standard work limiting disability definition used by the Department for Work and Pensions (DWP). The definition is consistent with the approach of legislation such as the DDA, where disability encompasses considerable heterogeneity in terms of the nature of the health problem. Some consideration is given to heterogeneity in terms of the type and number of health problems in the analysis.

[8] The concentration in part-time employment is higher amongst those with more specific health measures such as taking medicine, experiencing pain, difficulty with mobility, difficulty with self care, difficulty with usual activity, anxiety or depression. Physical and mental wellbeing index (EQ-5 and GHQ12) values also confirm this.

$$P^{*}_{ij} = \beta_j X_{ij} + \varepsilon_{ij} \quad (2)$$

where the variable P_{ij}, which is only observed if E_{ij}=1, is related to the latent variable P^{*}_{ij} as follows:

$$P_{ij} = \begin{cases} 1 \text{ if } P^{*}_{ij} > 0 \\ 0 \text{ otherwise} \end{cases}$$

Thus, P_{ij}=1 and P_{ij}= 0 indicate part-time and full-time employment respectively and, following similar studies, a self-assessed measure is used.[9]

It is assumed that μ_{ij} and ε_{ij} are distributed as bivariate normal with zero means, unit variances and that the correlation between the two errors is ρ_j. Given unobservables may affect both equations (e.g. ability) the correlation may be non-zero $(\rho_j \neq 0)$ and in this situation the results from a simple probit model will be biased.

The variables that determine employment, Y_{ij}, are standard in the literature and include age, aged squared, marital status, ethnicity, educational qualifications, the presence of dependent children, housing related variables and a set of regional controls. These variables are also included as determinants of part-time employment X_{ij}. Identification is achieved in this type of model by including at least one variable one in the selection equation that does not affect the outcome equation. In the current context it is difficult to find an appropriate identifying variable that will affect the employment decision, but not the choice of hours. Whilst this type of selection model can be estimated with identical variables in both equations it relies on weak identification through the non-linear error

[9] See Manning and Petrongolo (2004) for a discussion of the relative advantages and disadvantages of this type of measure. It is reassuring to note that the percentage of self reported part-time workers who report total usual hours in the main job equal to or less than 30 is 97%, compared to 4% for those who self report full-time employment.

term.[10] Instead, identification is achieved in this model by including a variable indicating the length of time at the present residence was less than 12 months. Whilst a change of residence may involve a period without employment it is less likely to change an individuals preference between full and part-time work.[11] Indeed, a short duration at the current residence is found to have a negative effect on employment (with the exception of disabled men) but does not have a significant effect on the choice of hours.[12]

Additional variables that are observed only for the employed are included in X_{ij} such as industry, occupation, firm size and sector. For the work-limited disabled a separate specification is estimated that supplements the above model with controls for the type of health problem and the number of health problems to examine within group heterogeneity. Five health groups are constructed namely, main health problem affects limbs; sight and hearing, skin breathing and organs; mental health and other.

Since the focus of this paper is the part-time employment decision the estimates from the bivariate probit model are used to form the predicted probability of part-time employment conditional on employment (P_{ij}^{C}).[13] The average probability for the jth group, with sample η_j, is:

[10] In the case of identical explanatory variables between the selection and outcome equation Sartori (2003) proposes an alternative estimator, which assumes the error terms in the two equations are perfectly correlated for a given observation $(\rho_j = 1 \text{ or } \rho_j = -1)$. This estimator is applied to the data, however, for the majority of specifications the correlation between the two errors terms violate the assumptions required for the technique. Results are therefore are not reported here.

[11] It could also be argued the unemployed have more incentive to relocate.

[12] Since for disabled men the bivariate probit relies on weak identification, the robustness of the results are tested using a simple probit model of the second stage (i.e assuming $\rho_j = 0$). In a similar manner to equations (4) and (5) a probit decomposition (Gomulka and Stern, 1990) is applied to decompose the probability of part-time employment into explained and unexplained components. The sensitivity of the main results are also tested to controlling for unobservable characteristics (e.g. preferences, motivation) which may contribute to any unexplained difference between the groups identified in (4) and (5). The decomposition is computed using estimates from a random effects probit model on individuals who enter the LFS in 2003 using the 5 quarter longitudinal LFS data.

[13]The employment decision has previously been decomposed using a simple probit (see Jones 2006 and Kidd et al. 2000).

$$P_j^C = \frac{1}{\eta_j}\sum_{i=1}^{\eta_j}\frac{\Phi_2(\beta_j X_{ij}, \gamma_j Y_{ij}, \rho_j)}{\Phi(\gamma_j Y_{ij})} \quad (3)$$

where $\Phi_2()$ represents the bivariate normal distribution and $\Phi()$ the standard normal distribution. An Oaxaca (1973) type decomposition, which was applied to the bivariate probit by Mohanty (2002), can be used to isolate the unexplained difference in predicted conditional probabilities. This represents the difference in part-time employment due to differences in the coefficient structure between the groups, conditional on the same employment equation.[14] For the work-limited the unexplained gap is[15]:

$$(P_{D_1}^C - P_N^C)_{\text{unexplained}} = \frac{1}{\eta_N}\sum_{i=1}^{\eta_N}\frac{\Phi_2(\beta_{D_1} X_{iN}, \gamma_N Y_{iN}, \rho_N)}{\Phi(\gamma_N Y_{iN})} - \frac{1}{\eta_N}\sum_{i=1}^{\eta_N}\frac{\Phi_2(\beta_N X_{iN}, \gamma_N Y_{iN}, \rho_N)}{\Phi(\gamma_N Y_{iN})} \quad (4)$$

For the non-work limited the unexplained gap is:

$$(P_{D_2}^C - P_N^C)_{\text{unexplained}} = \frac{1}{\eta_N}\sum_{i=1}^{\eta_N}\frac{\Phi_2(\beta_{D_2} X_{iN}, \gamma_N Y_{iN}, \rho_N)}{\Phi(\gamma_N Y_{iN})} - \frac{1}{\eta_N}\sum_{i=1}^{\eta_N}\frac{\Phi_2(\beta_N X_{iN}, \gamma_N Y_{iN}, \rho_N)}{\Phi(\gamma_N Y_{iN})} \quad (5)$$

The first term on the right hand side of equation (4) is the predicted conditional probability of being employed part-time if the non-disabled have the same coefficients for the part-time employment equation as the work limited disabled conditional on their own employment equation and characteristics. Therefore the difference captures the effect of having a different coefficient structure between groups only when choosing part-

[14] Note this differs from the total unexplained gap of a decomposition of (3) for the work-limited disabled and the non-disabled. Equations (4 and 5) represent the unexplained gap of the second choice decision only. The reason for this distinction is that if all coefficients are allowed to vary the difference between the work limited and the non-work limited in equation (4) will be the combined influence of discrimination and unobserved productivity effects in employment *and* marginalisation and accommodation effects in part-time employment. Equation (5) will then identify the combined influence of discrimination in employment and marginalisation in the part-time/full-time decision. However, each of the separate influences cannot be identified. By focusing only on the second stage the influence of marginalisation and accommodation can both be identified, but, of course, the technique assumes that the influence of discrimination on entry to employment can be separated from the marginalisation that may occur in the second stage.

[15] The non-disabled have been used as the reference category given their dominance in the population. The results are not sensitive to this and are similar if the pooled coefficient structure is used. The results presented in Table 7 enable a comparison of the decomposition across the three alternative base groups.

time or full time employment. As DeLeire (2001), it is assumed that disability has no unobserved effect on the non work limited disabled. In this case the non-work limited disabled are assumed to have no need to accommodate their disability in work, thus the unexplained gap (5) will only reflect unequal treatment in the hours of work equation.[16] If it is also assumed that any form of unequal treatment against the non-work limited disabled is equal to that experienced by the work limited disabled then the difference between equations (4) and (5) will measure the effect of workplace accommodations.[17] The interpretation rests on the assumption that all disabled workers are equally discriminated against, but this will not hold if discrimination is related to the work-limiting nature of the disability. If this assumption of DeLeire (2001) fails to hold a lower bound of unequal treatment in employment type is identified for the work-limited disabled.

4. Results

4.1 Descriptive Statistics

Part-time employment is a more important source of work in the UK than the US, representing 24% and 13% of employment respectively.[18] In both countries, part-time employment rates are higher for disabled employees than the non-disabled (see Table 1), although the difference in the UK, where part-time employment represents 22% of employment for the non-disabled and 30% for the disabled, is not as dramatic as in the US, where the rates are 13% and 30% respectively (see Schur, 2003 for the US data). Consistent with Schur (2002), there is a wage penalty for working part time. The disabled workers earn 84% of the average for non-disabled workers for the full time males, 79% for part-time males, 87% for full time females and 93% part-time females. However, all individuals who work part time face a wage penalty and part-time disabled men only earn 62% of the non-disabled full time wage.

[16] Of course unequal treatment in the employment equation may still exist.

[17] This is equivalent to $(P_{D_1}^C - P_{D_2}^C)_{\text{unexplained}}$ evaluated at the non-disabled base.

[18] Source: OECD Labour Market Data 2004. Employees aged 15-64.

Table 2 presents the mean values of the variables include in the analysis. It is important to highlight the difference in educational attainment between the disability groups, which may contribute to their concentration in part-time employment. The work limited disabled are less than half as likely to have qualifications at degree level and have a higher concentration with no qualifications (the omitted group). Consistent with this, the work limited disabled are under represented in managerial occupations but are concentrated in occupations such as personal services, plant and machine operatives and other elementary occupations, where part-time employment is also more common.[19]

4.2 Bivariate probit

The results for the bivariate probit models estimated on each of the disability groups are presented in Tables 3 and 4 for males and females respectively. A likelihood ratio test indicates the rho parameter is significant at the 10% level for all specifications.[20] This supports the bivariate probit model adopted here and suggests that inferences may be misleading when no correction is made for selection into employment.[21] In all specifications the correlation is negative, indicating that unobservables that affect employment positively have a negative effect on the probability of part-time employment.

The coefficient estimates from the employment equation are largely in accordance with expectations and since these influences are discussed elsewhere (see for example Kidd et al. 2000 and Jones et al. 2006) the focus here is on the estimates from the part-time employment equation, which are qualitatively similar across the disability groups. As expected, many of the variables influence part-time employment in the opposite direction to employment. For example, part-time employment decreases with age. In contrast, living in social rented accommodation and being a member of an ethnic minority has a positive effect on the probability of part-time employment.

[19] The Duncan and Duncan (1955) index of occupational segregation between part-time and full-time workers is relatively similar between disability groups and this is greater than the occupational segregation that exists between disabled and non-disabled workers regardless of employment type.
[20] The only exception to this is for the work limited disabled females where the correlation lies just outside the 10% significance level.
[21] The variables typically have a similar qualitative influence in the probit model. Results are available from the author on request.

There are some gender specific effects, possessing higher qualifications has a consistently strong negative on part-time employment for females. For work limited disabled males, having medium level qualifications reduces the probability of working part-time relative to the base group who have no qualifications.[22] In contrast for the non-work limited disabled and the non-disabled groups having the highest level qualifications (such as a degree) has a positive effect on part-time employment. Being married and having dependent children increases the probability of part-time employment for females, consistent with expectations. For males, whilst marriage has no significant effect, having another earner in the household reduces the probability of working part-time.

The employment related variables have an important influence on the choice of hours, working in a small firm increases the probability of working part-time, whereas working in manufacturing, banking and finance, transport and communication and, for males only, construction decreases the probability of working part-time. Relative to being in a managerial role all other occupations have a positive influence on part-time employment, the marginal effect is strongest for males and females in sales and customer service occupations and for females in personal service occupations.

Table 5 presents the specifications for the work-limited disabled that are supplemented with controls for heterogeneity within the disabled group. Consistent with previous evidence (Blackaby et al., 1999 and Kidd et al., 2000) mental health problems (the omitted group) are found to have the most negative effect on employment for both disabled males and females. Similarly, individuals with any health problems other than mental health have a lower probability of being employed part-time, confirming the severe labour difficulties faced by individuals in this group.[23] The number of health problems, which is frequently used to proxy the severity of the disability, has a negative effect on employment as expected. This variable also has a positive effect on part-time employment which is consistent with the workplace accommodation argument. Moreover, the number of health problems does not affect the choice of hours for the non-

[22] The effects are only significant for qualifications, up to and including A levels.
[23] The 'other' health group is not significantly different to mental health for females.

work limiting disabled, which lends support to the first assumption of the decomposition that their disability does not affect their choice of hours.

4.3 Conditional Probabilities

The bivariate probit models presented in Tables 3 and 4 are used to estimate the conditional part-time employment probabilities for each gender and disability group and these results are presented in the Table 6. Consistent with the evidence presented in Table 1 the conditional part-time employment probability is 11% for disabled males, more than double their non-disabled counterparts and 50% for disabled females, just over 10 percentage points higher than the non-disabled. Table 7 shows the effect of changing the coefficients in the part-time employment equation on the predicted probabilities, whilst all other components are left constant. If the non-disabled males behave as the work limited disabled their predicted conditional probability of part-time employment would rise to nearly 16% (row 3, column 1), an 11 percentage point increase over their own conditional probability. Similar for females, the probability rises to 58%, nearly 19 percentage points higher than their own rate. Reassuringly, if the work limited disabled are assumed to have the same part-time employment preferences as the non-disabled (row 1, column 3) their predicted conditional probability of part-time employment falls relative to their own preferences. It is clear that for a given set of observable characteristics and selection equation, the coefficients for part-time employment for the work limited disabled increase the conditional probability of part-time employment.

These unexplained gaps reflect a combination of differences in preferences and employer discrimination. If instead the coefficients from the non-work limited disabled are imposed on the non-disabled (row 3, column 2) the probability of part-time employment rises only slightly, by less than 1 percentage point for males and females. Thus, it is the work-limiting nature of the disability that is driving these results and under the assumptions of DeLeire (2001), this means that the majority of the part-time employment gap is due to the role of part-time employment as an accommodation for a work limiting disability. The effect of employer marginalisation, albeit a lower bound estimate, is very small,

accounting for only 7% and 3% of the unexplained disability gap in part-time employment for work-limited disabled males and females respectively.[24]

5. Conclusion

This paper identifies the concentration of disabled workers in part-time work in the UK, a feature shared with recent evidence from the US. By extending a method proposed by DeLeire (2001) this paper considers an issue raised in the US literature, that is, if part-time employment is a result of employer restrictions or choices made by the disabled. The conditional probability of part-time employment is modelled using a bivariate probit model which controls for non-random selection into employment. The evidence suggests that the probability of part-time employment for the non-disabled would only increase if they behave like the work limited disabled and not the non-work limited disabled. This is consistent with the work limiting nature of the disability being the principal determinant of part-time employment and, following the assumptions of a DeLeire (2001) type approach, provides more support for part-time employment as a workplace accommodation than discrimination against the entire disabled group.[25]

Heterogeneity within the disabled group is also identified on the basis of the type of health problem. Individuals with mental health problems are significantly more likely to be employed part-time, in addition to being the least likely to be in employment confirming the particular labour market disadvantage faced by this disabled group. Part-time employment also increases with the number of health problems supporting its role in facilitating employment for those that otherwise could not to work.

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[24] For the cross sectional probit decomposition $(P_{D_1}^C - P_N^C)_{\text{unexplained}}$=0.042 (males) and 0.070 (females) and $(P_{D_2}^C - P_N^C)_{\text{unexplained}}$ =-0.008 (males) and -0.015 (females). Whilst the values of $(P_{D_1}^C - P_N^C)_{\text{unexplained}}$ are smaller than in the bivariate probit decomposition the overall conclusions remain the same. Workplace accommodation plays a far greater role than discrimination in the choice of part-time employment. Indeed, the small negative discrimination effect is consistent with there being no discrimination against the disabled in terms of hours. It is also reassuring to note that these results are robust to using the longitudinal data (all who entered the LFS in 2003) and, the results are qualitatively similar for females after controlling for random effects. For males, however, the small sample sizes precluded this additional estimation.

[25] Confirming this, the disabled were less likely to report that they *could not find full time job* as an explanation for their part-time employment status.

The cross sectional nature of the Labour Force Survey means that several issues related to the dynamic nature of disability and labour market transitions cannot be considered effectively and remain a topic for future research. Longitudinal data could be used to examine if transitions into (out from) part-time employment are the result of disability onset (exit). Equally, future research needs to consider other mechanisms through which the disabled may accommodate their disability and thus areas where policymakers may facilitate access to work. Obvious features of employment that may be important and that have received little attention include home working and travel to work.

[Word count: 4,234]

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Table 1. Descriptive Statistics

	Male			Female		
	Disabled	**Non-work limited disabled**	**Non-disabled**	**Disabled**	**Non-work limited disabled**	**Non-disabled**
Employment rate	37.41	87.20	88.62	36.02	77.30	77.20
Of those in employment						
% in part-time employment	11.33	5.25	5.00	49.43	39.17	39.49
% temporary contract	5.31	3.62	4.12	6.53	4.71	5.48
% flexible working hours	9.83	8.96	8.81	13.28	14.30	12.68
% shiftwork	22.93	21.54	21.90	16.94	15.64	15.59
Part time employment						
Average hourly earnings	7.43	9.25	9.37	7.33	7.33	7.92
% Incapacity benefit claimants	7.76			3.44		
Full time employment						
Average hourly earnings	10.02	11.73	11.94	8.61	9.49	9.87
% Incapacity benefit claimant	1.73			2.27		

Notes to table: Sample is restricted to UK employees of working age and excludes full-time students.

Table 2. Variable means

	Males			Females		
	Work limited	Non-work limited	Non-disabled	Work limited	Non-work limited	Non-disabled
Employment	0.370	0.871	0.884	0.357	0.770	0.770
Part-time	0.115	0.053	0.049	0.497	0.394	0.396
Age	47.537	45.792	39.014	44.330	42.401	38.173
Single	0.282	0.240	0.360	0.227	0.241	0.302
Married	0.584	0.678	0.573	0.577	0.629	0.597
University degree	0.079	0.174	0.214	0.071	0.134	0.174
Other higher education	0.058	0.093	0.087	0.080	0.109	0.105
A Level	0.272	0.320	0.282	0.124	0.159	0.161
O level	0.129	0.153	0.177	0.218	0.266	0.277
Other qualifications	0.158	0.138	0.130	0.159	0.159	0.139
Owned	0.251	0.242	0.176	0.205	0.204	0.159
Mortgaged	0.347	0.582	0.620	0.382	0.551	0.603
Social housing	0.316	0.107	0.104	0.331	0.164	0.139
Dependent child 19	0.464	0.529	0.682	0.658	0.704	0.913
Dependent child 2	0.035	0.045	0.075	0.042	0.056	0.098
White	0.933	0.956	0.930	0.921	0.947	0.919
Other earner	0.420	0.632	0.666	0.508	0.679	0.718
Small firm	0.274	0.238	0.239	0.318	0.293	0.288
Agriculture and fishing	0.013	0.011	0.011	0.004	0.004	0.003
Manufacturing	0.238	0.254	0.238	0.078	0.077	0.087
Construction	0.084	0.092	0.100	0.012	0.018	0.015
Distribution, hotels etc	0.175	0.153	0.160	0.234	0.200	0.202
Transport and communication	0.107	0.103	0.101	0.032	0.036	0.039
Banking and finance	0.122	0.141	0.152	0.122	0.138	0.151
Public admin	0.189	0.180	0.178	0.457	0.471	0.445
Public sector	0.201	0.204	0.195	0.373	0.388	0.374
Professional	0.103	0.126	0.142	0.079	0.102	0.118
Associate professional	0.118	0.126	0.139	0.127	0.134	0.149
Administrative	0.061	0.053	0.054	0.217	0.253	0.240
Skilled trades	0.176	0.164	0.166	0.023	0.019	0.016
Personal service occupations	0.034	0.025	0.021	0.152	0.138	0.134
Sales and customer service	0.036	0.033	0.038	0.131	0.113	0.110
Process, plant and machine	0.160	0.149	0.130	0.039	0.026	0.027
Elementary	0.176	0.120	0.113	0.156	0.115	0.104
Limbs	0.390	-	-	0.408	-	-
Sight or hearing	0.039	-	-	0.034	-	-
Skin, breathing organs	0.321	-	-	0.253	-	-
Mental	0.129	-	-	0.149	-	-
Other	0.122	-	-	0.155	-	-
Number of health problems	2.582	-	-	2.620	-	-

Notes to table: Means relate to regression samples

Table 3. Bivariate probit estimates -Males

	Work-limited disabled				Non-work limited disabled				Non-disabled			
	Employment		**Part-time**		**Employment**		**Part-time**		**Employment**		**Part-time**	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Constant	-2.119***	0.227	1.073	0.974	-2.620***	0.332	1.482 *	0.876	-2.420***	0.128	1.520 ***	0.412
Age	0.079 ***	0.009	-0.111***	0.018	0.179 ***	0.014	-0.186***	0.023	0.169 ***	0.005	-0.184***	0.013
Age squared	-0.001***	0.000	0.002 ***	0.000	-0.002***	0.000	0.002 ***	0.000	-0.002***	0.000	0.002 ***	0.000
Single	-0.103 *	0.061	0.272 **	0.128	-0.111	0.102	0.141	0.143	-0.092 **	0.045	0.089	0.069
Married	0.121 **	0.053	0.020	0.120	0.129	0.087	-0.012	0.123	0.102 **	0.040	0.006	0.062
University	0.841 ***	0.063	-0.251	0.280	0.060	0.086	0.368 **	0.155	0.308 ***	0.035	0.243 ***	0.075
Other higher education	0.781 ***	0.070	-0.262	0.264	-0.088	0.095	0.192	0.149	0.312 ***	0.045	0.156 *	0.080
A Level	0.540 ***	0.043	-0.389***	0.149	0.320 ***	0.074	0.044	0.135	0.391 ***	0.033	-0.014	0.067
O level	0.555 ***	0.052	-0.292*	0.175	0.156 *	0.086	0.120	0.129	0.316 ***	0.035	-0.065	0.063
Other quals	0.386 ***	0.049	-0.285**	0.129	0.263 ***	0.086	-0.045	0.129	0.306 ***	0.037	-0.108*	0.063
Owned	0.103	0.063	0.309 *	0.162	-0.286***	0.101	0.634 ***	0.154	-0.208***	0.040	0.262 ***	0.054
Mortgaged	0.439 ***	0.060	-0.071	0.184	0.321 ***	0.098	0.129	0.174	0.229 ***	0.036	-0.115**	0.052
Social Housing	-0.479***	0.060	0.554 ***	0.139	-0.387***	0.106	0.395 **	0.168	-0.568***	0.040	0.304 ***	0.076
Child 19	0.008	0.019	0.099 **	0.044	-0.057	0.036	0.054	0.046	-0.052***	0.013	0.107 ***	0.018
Child 2	0.074	0.086	-0.312*	0.173	0.045	0.134	-0.254	0.206	0.093 **	0.045	-0.147**	0.064
White	0.316 ***	0.064	-0.450***	0.117	0.409 ***	0.103	-0.311**	0.140	0.359 ***	0.036	-0.482***	0.051
Other earner	0.491 ***	0.034	-0.477***	0.096	0.484 ***	0.051	-0.316***	0.101	0.387 ***	0.022	-0.226***	0.045
Mover	0.025	0.058			-0.034	0.092			-0.138***	0.032		
Small firm			0.447 ***	0.115			0.311 ***	0.084			0.371 ***	0.035
Agriculture			-0.120	0.253			-0.860**	0.411			-0.414***	0.124
Manufacturing			-0.490***	0.167			-0.670***	0.200			-0.684***	0.072
Construction			-0.562***	0.203			-0.653***	0.225			-0.722***	0.087
Distribution			0.062	0.116			0.095	0.127			-0.015	0.058
Transport and communication			-0.277*	0.146			-0.273*	0.148			-0.359***	0.067
Banking Finance			-0.368**	0.154			-0.102	0.130			-0.423***	0.065
Public admin			0.106	0.127			0.254 *	0.135			0.052	0.062
Public			-0.136	0.107			-0.217**	0.109			-0.046	0.051
Professional			0.290 *	0.159			0.378 **	0.150			0.362 ***	0.067
Associate			0.306 **	0.155			0.170	0.142			0.331 ***	0.067
Administrative			0.658 ***	0.206			0.593 ***	0.185			0.718 ***	0.078
Skilled trades			0.165	0.137			0.026	0.153			0.233 ***	0.070
Personal service			0.511 **	0.205			1.077 ***	0.254			1.010 ***	0.092
Sales and customer service			0.720 ***	0.224			0.724 ***	0.211			1.068 ***	0.083
Process, plant and machine			0.365 **	0.155			0.534 ***	0.167			0.611 ***	0.072
Elementary			0.855 ***	0.230			1.022 ***	0.222			1.048 ***	0.076
Rho[a]			-0.608*				-0.696**				-0.402*	
Log Likelihood	-5285.60				-2546.27				-14008.66			
Observations	8643				5813				32843			
Uncensored	3200				5062				29049			

Notes to table: Specification includes a full set of quarterly and regional dummies not reported here. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. [a] A likelihood ratio test of independent equations is used to indicate the significance of rho.

Table 4. Bivariate probit estimates -Females

	Work-limited disabled				Non-work limited disabled				Non-disabled			
	Employment		Part-time		Employment		Part-time		Employment		Part-time	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Constant	-1.625***	0.251	-0.518	0.885	-3.160***	0.322	0.500	0.604	-2.625***	0.121	-1.295***	0.232
Age	0.054 ***	0.011	-0.016	0.019	0.172 ***	0.015	-0.132***	0.018	0.157 ***	0.006	-0.059***	0.008
Age squared	-0.001***	0.000	0.000 **	0.000	-0.002***	0.000	0.002 ***	0.000	-0.002***	0.000	0.001 ***	0.000
Single	-0.148***	0.056	0.069	0.088	-0.022	0.080	-0.180**	0.085	-0.108***	0.034	0.078 **	0.036
Married	-0.197***	0.043	0.349 ***	0.065	-0.253***	0.064	0.389 ***	0.065	-0.331***	0.029	0.470 ***	0.029
University degree	1.005 ***	0.064	-0.681***	0.164	0.691 ***	0.077	-0.320***	0.108	0.723 ***	0.030	-0.268***	0.045
Other higher education	0.912 ***	0.059	-0.535***	0.164	0.689 ***	0.078	-0.263**	0.103	0.817 ***	0.034	-0.193***	0.046
A Level	0.718 ***	0.051	-0.567***	0.113	0.591 ***	0.069	-0.237***	0.090	0.577 ***	0.029	-0.172***	0.038
O level	0.615 ***	0.044	-0.374***	0.116	0.553 ***	0.060	-0.196**	0.081	0.508 ***	0.025	-0.088**	0.035
Other	0.518 ***	0.047	-0.331***	0.108	0.362 ***	0.064	-0.262***	0.077	0.366 ***	0.028	-0.171***	0.035
Owned	0.095	0.065	0.128	0.107	-0.007	0.084	0.394 ***	0.099	-0.064*	0.033	0.317 ***	0.038
Mortgaged	0.334 ***	0.060	-0.224**	0.097	0.440 ***	0.076	-0.050	0.097	0.364 ***	0.028	0.031	0.036
Social	-0.438***	0.061	0.146	0.129	-0.142*	0.081	0.209 **	0.097	-0.287***	0.032	0.231 ***	0.041
Child 19	-0.148***	0.019	0.334 ***	0.033	-0.388***	0.024	0.532 ***	0.027	-0.367***	0.009	0.515 ***	0.011
Child 2	-0.468***	0.088	0.659 ***	0.138	-0.416***	0.081	0.644 ***	0.104	-0.501***	0.025	0.568 ***	0.034
White	0.405 ***	0.063	0.090	0.162	0.430 ***	0.082	0.352 **	0.140	0.400 ***	0.028	0.338 ***	0.044
Other earner	0.435 ***	0.036	-0.212**	0.092	0.376 ***	0.047	-0.056	0.063	0.297 ***	0.020	-0.017	0.024
Mover	-0.107*	0.060			-0.201***	0.069			-0.163***	0.026		
Small firm			0.423 ***	0.084			0.369 ***	0.049			0.349 ***	0.019
Agriculture			-0.196	0.335			-0.318	0.325			-0.054	0.147
Manufacturing			-0.593***	0.175			-0.521***	0.129			-0.403***	0.049
Construction			-0.156	0.206			0.136	0.165			-0.102	0.075
Distribution			-0.044	0.102			0.123	0.100			0.071 *	0.041
Transport and communication			-0.023	0.141			-0.316**	0.139			-0.272***	0.055
Banking Finance			-0.247**	0.117			-0.057	0.101			-0.127***	0.042
Public admin			-0.019	0.096			0.064	0.093			0.117 ***	0.039
Public			0.035	0.062			0.066	0.059			-0.008	0.026
Professional			0.586 ***	0.163			0.303 ***	0.109			0.365 ***	0.043
Associate			0.565 ***	0.152			0.522 ***	0.100			0.578 ***	0.040
Administrative			0.693 ***	0.167			0.736 ***	0.096			0.834 ***	0.038
Skilled trades			0.781 ***	0.219			0.604 ***	0.168			0.718 ***	0.071
Personal service			0.882 ***	0.190			0.909 ***	0.110			0.886 ***	0.042
Sales and customer service			1.154 ***	0.233			1.268 ***	0.124			1.349 ***	0.046
Process, plant and machine			0.691 ***	0.189			1.010 ***	0.171			0.778 ***	0.065
Elementary			1.354 ***	0.274			1.552 ***	0.134			1.543 ***	0.047
Rho [a]			-0.724				-0.611***				-0.408***	
Log Likelihood	-6255.62				-4999.57				-30845.43			
Observations	8631				5937				37286			
Uncensored	3078				4574				28707			

Notes to table: See notes to Table 3.

Table 5. Bivariate probit estimates- Type of health problem

	Work limited disabled males				Work limited disabled females			
	Employment		Part-time		Employment		Part-time	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Constant	-2.490***	0.243	1.119	1.207	-2.095***	0.265	-0.696	0.907
Age	0.089***	0.010	-0.112***	0.023	0.070***	0.012	-0.016	0.021
Age squared	-0.001***	0.000	0.002***	0.000	-0.001***	0.000	0.000*	0.000
Single	-0.056	0.064	0.235*	0.138	-0.135**	0.059	0.044	0.092
Married	0.126**	0.055	0.033	0.131	-0.251***	0.045	0.364***	0.068
University degree	0.777***	0.066	-0.130	0.297	0.964***	0.066	-0.592***	0.167
Other higher education	0.771***	0.074	-0.157	0.295	0.888***	0.061	-0.439***	0.166
A Level	0.471***	0.045	-0.285*	0.166	0.688***	0.053	-0.499***	0.121
O level	0.503***	0.055	-0.218	0.191	0.577***	0.046	-0.303***	0.117
Other qualifications	0.363***	0.051	-0.234	0.147	0.499***	0.049	-0.282**	0.113
Owned	0.096	0.066	0.351**	0.167	0.073	0.067	0.148	0.106
Mortgaged	0.433***	0.063	-0.018	0.200	0.314***	0.062	-0.199**	0.099
Social housing	-0.425***	0.064	0.478***	0.158	-0.398***	0.064	0.074	0.127
Dependent child 19	-0.020	0.020	0.132***	0.042	-0.189***	0.019	0.359***	0.030
Dependent child 2	0.049	0.091	-0.308*	0.182	-0.505***	0.089	0.666***	0.145
White	0.389***	0.067	-0.486***	0.135	0.478***	0.065	0.118	0.160
Other earner	0.438***	0.036	-0.412***	0.108	0.386***	0.037	-0.148*	0.087
Limbs	0.767***	0.058	-0.665***	0.204	0.684***	0.054	-0.362***	0.138
Sight and hearing	0.818***	0.093	-0.799***	0.239	0.779***	0.094	-0.314*	0.189
Breathing and organs	0.809***	0.059	-0.679***	0.215	0.764***	0.057	-0.409***	0.146
Other	0.393***	0.069	-0.318*	0.163	0.456***	0.062	-0.088	0.139
Number health problems	-0.226***	0.011	0.150**	0.063	-0.182***	0.010	0.088***	0.034
Mover	-0.006	0.063			-0.131**	0.063		
Small firm			0.486***	0.109			0.454***	0.074
Agriculture and fishing			-0.176	0.277			-0.281	0.358
Manufacturing			-0.553***	0.169			-0.627***	0.162
Construction			-0.679***	0.214			-0.172	0.221
Distribution, hotels etc			0.043	0.125			-0.048	0.108
Transport and communication			-0.296*	0.154			-0.013	0.151
Banking and finance			-0.409***	0.158			-0.264**	0.117
Public admin			0.115	0.138			-0.011	0.103
Public sector			-0.188	0.117			0.027	0.067
Professional			0.338**	0.168			0.635***	0.154
Associate professional			0.332**	0.163			0.626***	0.142
Administrative			0.729***	0.206			0.752***	0.146
Skilled trades			0.189	0.149			0.860***	0.208
Personal service occupations			0.520**	0.208			0.958***	0.168
Sales and customer service			0.801***	0.224			1.262***	0.199
Process, plant and machine			0.403**	0.162			0.745***	0.186
Elementary			0.909***	0.216			1.472***	0.226
Rho [a]			-0.497				-0.622*	
Log Likelihood	-4852.643				-5924.497			
Observations	8583				8581			
Uncensored	3187				3068			

Notes to table: See notes to Table 3.

Table 6. Predicted probabilities

	Males			Females		
	Work limited disabled	**Non-work limited disabled**	**Non-disabled**	**Work limited disabled**	**Non-work limited disabled**	**Non-disabled**
Probability of employment	0.3714 (0.255)	0.8708 (0.145)	0.8846 (0.128)	0.3573 (0.229)	0.7703 (0.184)	0.7699 (0.197)
Conditional probability of part-time employment (P_j^C)	0.1144 (0.128)	0.0530 (0.087)	0.0495 (0.079)	0.4971 (0.247)	0.3935 (0.258)	0.3937 (0.261)

Notes to table: Predicted probabilities calculated from bivariate probit estimates presented in Tables 3 and 4. Standard deviations are included in parentheses. Probabilities are calculated as follows:

$$\hat{P}_{\text{Emp } ij} = \Phi(\gamma_j Y_{ij})$$

$$\hat{P}_{ij}^{C} = \frac{\Phi_2(B_j X_{ij}, \gamma_j Y_{ij}, \rho_j)}{\Phi(\gamma_j Y_{ij})}$$

Table 7. Decomposition of predicted conditional employment probabilities

	Coefficient on part-time employment equation		
Males	β_{D_1}	β_{D_2}	β_N
Disabled work limited	0.1144 (0.128)	0.0295 (0.058)	0.0247 (0.049)
Disabled non-work limited	0.1722 (0.177)	0.0530 (0.087)	0.0462 (0.077)
Non-disabled	0.1578 (0.161)	0.0573 (0.090)	0.0495 (0.079)
$(P_{D_1}^C - P_N^C)_{\text{unexplained}}$	0.1083		
$(P_{D_2}^C - P_N^C)_{\text{unexplained}}$	0.0079		
Females	β_{D_1}	β_{D_2}	β_N
Disabled work limited	0.4971 (0.247)	0.2753 (0.246)	0.2639 (0.238)
Disabled non-work limited	0.6025 (0.238)	0.3935 (0.258)	0.3872 (0.250)
Non-disabled	0.5809 (0.246)	0.3991 (0.267)	0.3937 (0.261)
$(P_{D_1}^C - P_N^C)_{\text{unexplained}}$	0.1872		
$(P_{D_2}^C - P_N^C)_{\text{unexplained}}$	0.0054		

Notes to table: Standard deviation included in parenthesis. Estimates calculated from equations (4) and (5)